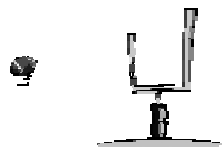# ANALYZE EVALUATION DATA

Analyze Evaluation Data

Introduction   For the next three and a half hours we will talk about how to Analyze Evaluation Data to include how to analyze, compare, quantify, interpret and summarize data gathered so that more informed decisions can be made in the school.

Importance   Have you ever bought a new or used car? Did you go around to different dealerships to see who had the better price? Did you ask someone whom you knew had the same model car you wanted, how he/she liked the car? This is analyzing evaluation data. Although buying a car experience has little to do with managing a Functional Learning Center (FLC), there are shared principles in making informed decision regarding an investment. Our investment is our Marines. To make decisions without analyzing the evaluation data properly means that we are, very possibly, not running our FLC as effectively as we could be.

Unit Objectives   <u>Terminal Learning Objective:</u> With the aid of references and given evaluation data, analyze evaluation data per the references.

<u>Enabling Learning Objectives</u>

With the aid of references and given evaluation data:

❖ Compile data per the references.

❖ Establish the categories for data comparison per the references.

❖ Quantify evaluation data per the references.

❖ Interpret data per the references.

❖ Summarize data per the references.

Analyze Evaluation Data (Cont)

This Lesson discusses the follow topics:

In this Lesson

Topic	See page
Topic 1: Guiding Principles for Analyzing Data	3
Topic 2: Compile Data	4
Topic 3: Establishing Categories for Data Comparison	8
Topic 4: Interpret Data	13
Topic 5: Summarize Data	24
References	29
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Guiding Principles for Analyzing Data

Objective

The objective of data analysis is to covert raw data into a coherent, meaningful format. Therefore, data must be gathered, sorted, arranged, and processed. **(Evaluation 2nd Ed, Carol Weiss, p. 271)** The end result can be thought of as a mix of research and marketing. The research (collecting and analyzing data) identifies the effectiveness of the training program. A marketing element can be seen when evidence links the quality product (in this case a trained Marine) back to the source (formal school). **(Training & Development, Feb 99, Vol. 53 Issue 2, p. 18)**

Review for consistency and accuracy	Incorrect, insufficient, or extreme data items should be eliminated. Also, accuracy is of utmost importance, because the analysis and interpretation will only be as reliable as the data itself.
Example	
Use all relevant data	In most evaluations, improvement is desired by the person conducting the evaluation, which may provide a built-in bias. It may be tempting to eliminate data that does not support the desired outcome, but all relevant data should be used. If data is not used, there should be an explanation as to why it was deleted.
Example	
Treat individual data confidentially	Data collected will usually be the result of individual performances. When analyzing and interpreting data and reporting results, the confidentiality of the sources should be an important concern unless there are conditions that warrant their exposure. The same atmosphere of confidentiality used in collecting data should be used in the analysis and reporting phases.
Example	
Use simplest statistics possible	The analysis should be as simple as possible and limited to what is necessary to draw the required conclusions from the data. Additional analysis that serve no benefit should be avoided.
Example	

(Handbook of Training Evaluation and Measurement Methods, 3rd Ed. pp. 237-238)

Compile Data

Purpose   Prior to analyzing data, the data must be compiled and organized. The purpose of the evaluation will guide what data should be compiled.

Sources of Data to be Compiled   Some of the sources of data are as follows:

Results/Scores of Written or Performance-based tests.
Questionnaire results (IRFs, AIRs, End of Course Critiques, etc.).
Interview notes.
Observation notes (Peer observations, external observations, etc.).
Site visit reports (Course graduate comments, relevance of material to Fleet Operation, etc.).
Course data (number of students, time of year, any unforeseen circumstances, etc.).
Course data (number of students, time of year, any unforeseen circumstances, etc.).
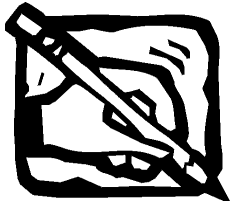
Skill Check #1

Turn in your binder to the tab labeled Exercise #1 and find skills check #1. A copy of student data generated from MCAIMS and student data generated from Excel can be found in the folder. Answer The question located on the form.
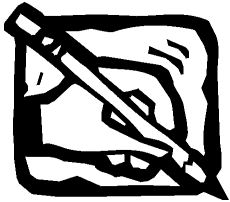
Skills Check

Compile Data (cont)

Organize Data

Once data is compiled, it needs to be organized by topic and time at which data was obtained. The organization of the data will depend upon the questions that need to be answered.

Organize Data by Topic	Evaluators should organize evaluation data into topic areas. For instance, an evaluator might organize data into topics of "Student Data," "Instructor Data," "Course Material Data," etc. Organizing the compiled data into topic areas further isolates the data pertaining to the questions that need to be answered through evaluation.

Skills Check

Skills Check #2

Turn in your binder to the tab labeled Exercise #1 and find skills check #2. Take five minutes to determine from the compiled data which sources provide information on the following: **(HINT - some data will provide information on more than one topic)**

(1)   Evaluates Student Learning/Performance.

(2)   Evaluates Instruction.

(3)   Evaluates Course Material.

(4)   Graduate Performance on the Job.

Compile Data (cont)

<table>
<tr><td rowspan="4">Organize
Data by
Topic</td></tr>
</table>

Student Learning / Performance	Analysis of student test data and performance may reveal a deficiency in a certain type of task; for instance tasks that involve reading. Further analysis of the trend may point to a deficiency in reading skills rather than the task that was being measured.
Instructor Performance	Data on instructor performance can be collected from student completion of IRFs, observation, peer ratings, etc. These data can be compared to look for trends revealing any deficiency in the instructor's presentation of instruction that must be addressed or further assessed.
Course Materials	Data gathered from After Instruction Reports (AIR), observation of the course, and student test data may reveal an instructional deficiency in a particular period of instruction that should be focused on in subsequent evaluations.
Graduate Performance	Data gathered through site visit reports, observation reports, or questionnaires to graduate and/or supervisors can provide data on whether the graduate is able to perform his/her job.

Marine Corps Automated Instructional Management System (MCAIMS).

Course data is maintained in MCAIMS. MCAIMS can also track the drops, progress, and absenteeism of students. Once test items/questions for questionnaires are entered into MCAIMS, then the test data/questionnaire data can be scanned or manually entered. Testing/Questionnaires, using MCAIMS, is optional.

Maintaining Data

Advantages	☑ Can scan test. ☑ Ability to provide reports with academic information. ☑ Can produce and scan questionnaires. ☑ Ease of access to information. ☑ Large amount of data can be processed. ☑ Time efficient. ☑ Performs statistical formulas.
Disadvantages	☒ Limited by what MCAIMS has been designed to produce. Making changes within MCAIMS to meet the specific needs of the schoolhouse cannot be done in-house. ☒ Must back up frequently. ☒ Complexity – must know how to use MCAIMS. ☒ Availability may be an issue for some FLCs.

Compile Data (cont)

Database / Spreadsheets.

Databases or spreadsheets (Example: Access/Excel) can be used to enter and maintain evaluation data. Formulas can be applied so that the database / spreadsheet will provide statistical data.

Advantages	☑ Ability to create database to fit specific needs of the school. ☑ Can be set up manually to provide the statistics needed.
Disadvantages	☒ Must Back up Frequently. ☒ Limited amount of data can be processed.

Course Booklets.

Course booklets are the paper-based version of maintaining data. It is recommended that course booklets be maintained at the schoolhouse for at least two years.

Advantages	☑ Can be viewed anyplace, at anytime, and anywhere.
Disadvantages	☒ Need storage area. ☒ Manual reports. ☒ Time-consuming. ☒ Greater chance of mathematical mistakes when providing statistics.

Establish Categories for Data Comparison

Description

Determinations must be made regarding what comparisons need to be made to provide meaning to the data. It is necessary to determine which comparisons will provide results that can reliably identify both strong and weak areas within the training program.

Compare Data

Evaluators should compare data from several different sources, both qualitative and quantitative. For example, an evaluator might look at observation notes from course observers (e.g., peer instructors, supervisors) and compare that data with student observations and responses covering the same topics. Once the results from several different sources are compared, evaluators should reconsider and, if necessary, revise conclusions made previously, particularly if they involve student performance. Some examples of comparisons that may assist an administrator are as follows:

- Percent of students accomplishing an objective with a previously established standard or with performance of previous classes on the same objective.

- Job performance data with class performance data.

- Job performance before and after attending instruction.

- The frequency of responses on different Instructional Rating Form (IRF) items, on different test items, or within multiple-choice items.

- Student opinions about the course with their test performance.

- Student comments about the course with those of the school staff.

- Final test scores with number of retests.

- Number of remedial instruction sessions per iteration of the course over a period of a year or more.

Skills Check

Skills Check #3
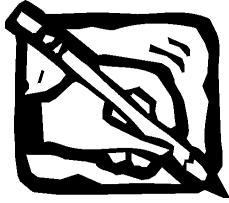
Skills Check

Read the scenario and write your answers in the blanks below. We'll discuss your answers in class.

You are the administrator of a schoolhouse. Data obtained from your most recent course identified an increase in students who had to go through remediation. What are some of the possible reasons for the increase? What comparisons of data could provide a better diagnosis of the problem?

_____

_____

_____

_____

_____

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_____

_____

_____

_____

_____

_____

Establish Categories for Data Comparison
(cont)

Analyze Data

Ensure that data has been collected from each component of the instructional system. Data may be numerical (test scores, responses on Likert-type rating scales) or non-numerical (data that are not quantified by numbers, e.g., observation notes, interview notes). Additionally, ensure that adequate data samples are collected to validate the reliability of the findings. **(DOD Mil-Handbook 1379-2, pg. 162)**

Quantify Evaluation Data

Most data, whether qualitative (e.g., subjective responses on a survey questionnaire concerning instructor performance) or quantitative (e.g., student performance test results), can be "quantified," that is, assigned a number of rating. Likert-type rating scales can be used to assign ratings to qualitative responses, thereby quantifying the data. Quantifying evaluation data allows numbers to be assigned and comparisons of statistical analysis to be performed to analyze and interpret the data.

```
Example of using Likert Scale to Quantify Data:

Strongly                                    Strongly
Disagree    Disagree    Neutral    Agree    Agree
   1           2           3         (4)       5
```

Establish Categories for Data Comparison
(cont)

Student Test Data

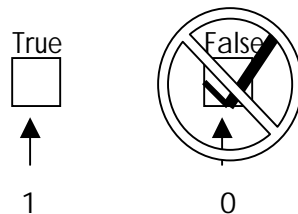**Quantify Evaluation Data (cont)**

Student performance results, either from written tests or performance tests, must be analyzed and interpreted to determine if students mastered the learning objectives required for successful performance on the job.

> ✎ **Written Tests.** Quantitative written test data come from true-false, multiple-choice, fill-in-the-blank, listing, and/or matching test items. These data, including qualitative written test data from essay and short answer tests, can be analyzed by assigning a value of "1" to a correct answer and a "0" to an incorrect answer; some test items, like essay or listing, can be assigned point values so that credit is given to partially correct answers. The test item scores for each student can then be summed to produce a total written test score for each student.
>
> **Example of Quantifying True/False Test Item:**
>
>
>
> True   False
>
> 1   0
>
> "False" was the wrong answer. Therefore, it is quantified as "0". If student had answered "True", then it would have been quantified as "1".

> ✎ **Performance Tests.** Performance tests typically have a checklist the evaluator completes during or following observation of student performance. These checklists typically consist of a list of the tasks under evaluation and a pass-fail rating the evaluator completes based on successful performance or failure of a specific task. Like written test items, each task may be quantified by assigning a "1" to a passed task and a "0" to a failed task. Scores can then be summed to produce a total performance test score for each student. Test performance data from graduates, gathered through observation of job performance, can be analyzed using the same process.

All other Data

All other data, including data measuring effectiveness of instructor performance, course materials, instructional environment, and the overall instructional program, can be analyzed using the same process that is used to analyze student test data. Survey questionnaire and interview data can be analyzed in the same manner as written test data, and data gathered through observation can be analyzed in the same manner as performance test data.

Skills Check

Skills Check #4

Turn in your binder to the tab labeled Exercise #1 and find skills check #4, Instructional Rating Form (IRF). Take five minutes to quantify the data.

Interpret Data

Description

By this point, data should have been organized by topic or area of study. Data will be in two forms: non-numerical and numerical. Generally, non-numerical data is more difficult to interpret and make judgments on.

Interpret Non-numerical Data

Once non-numerical data is assimilated into the area for which it pertains, a judgment is made regarding its meaning. It is important to view all data so information that contradicts can be identified and investigated.

Interpret Numerical Data

Normally, numerical data is assimilated and statistics are used to interpret the data. This can be done manually or through a computer program designed to calculate the statistics. Based on what comparisons will be made, a determination can be made whether to conduct manual- or computer-supported data analysis. Some simple statistical analysis may be easily performed manually. But there are many commercial off-the-shelf computer software packages available that will perform the statistical analysis necessary to analyze and interpret evaluation results.

Computer-Based Programs / Software	There are some options available where a computer program/software is designed to provide statistics regarding the data inputted.
	▣ **The Marine Corps Automated Instructional Management System (MCAIMS).** The evaluation module of MCAIMS can produce reports and statistics. For instance, MCAIMS can retrieve the class test results, an individual response report, an incorrect response report, an absentee report, and GPA/class standings reports for use by administrators. Overall there are fourteen reports that MCIAMS can generate. Within test statistics, MCAIMS automatically configures the mean, median, mode, and standard deviation. It also provides the number of perfect scores, number tested, number passed, and number failed.
	▣ **Statistical Software Program**. Various statistical software programs (Example: SPSS) are available for purchase. These software programs provide a statistical analysis of the data. Though many of them are easy to use and time efficient, they are costly.

Interpret Data (cont)

Interpret Numerical Data (cont)	**Descriptive Statistics**

Descriptive Statistics

There are a number of statistics that can be easily performed to aid in describing relationships and interpreting results. These descriptive data are useful for explaining results, making comparisons, and looking for trends. Statistics allow large amounts of information to be summarized. They also allow for the determination of the relationship between two or more items. Lastly, statistics show how to compare the differences in performance between two groups. **(Handbook of Training Evaluation and Measurement Methods, 3rd Ed. pp. 237-238)**

Frequency. A frequency distribution expresses the frequency of occurrence of a value (e.g., how many respondents obtained a particular score, how many respondents answered "a" on multiple-choice test item #3). Frequency counts are useful for determining how well students are doing on mastering a particular learning objective or course of instruction. Since test questions are developed from the learning objectives, the frequency for a test item can indicate possible problem areas in the instructional process of how the learning objective is being taught. It also can be used as an indicator of the clarity of a test question.

Question: In a class with 100 people, you have 5 students answer A, 67 answer B, 13 answer C, and 15 answer D on Item 18. B was the correct answer. What is the frequency of students who answered correctly?

Answer: _____

Mode. Mode is the most frequently occurring score.

1. Mode is useful for determining what most students score on a given test or test item.

2. Mode is particularly useful for determining what response most students select in a multiple-choice test item, thereby allowing analysis of the item's ability to clearly discriminate between correct and incorrect responses.

Question: These are the test scores from your class: Test 1: 87, 92, 60, 95, 90, 87, 100, 92, 85, 87. What is the mode for Test 1?

Answer:_____

Interpret Data (cont)

Interpret Numerical Data (cont)	**Descriptive Statistics (cont)**	**Median**. (Also referred to as the middle value). Median is the score that half the respondents score at or below. Median is useful for determining a "breaking score" which splits the class in half. **Question:** What is the median of the Test 1? **Answer:**_____
		Mean. Mean is the arithmetic average of all scores. Mean is calculated by adding all of the scores and dividing this by the number of respondents. ↳ Mean is useful for determining class averages on test items and test. ↳ Mean is also useful for determining overall attitudes toward a topic when using a Likert rating scale. For example, using a five-response Likert scale, a student rates the overall effectiveness of a course by answering 20 questions concerning course content, instructor performance, use of media, etc. The value circled for each response can then be summed for a total score. This score is then divided by the number of questions (20) to come up with the mean. In this case, the mean is a total rating of course effectiveness. **Question:** What is the mean of the Test 1? **Answer:** _____
		Range. Range is the difference between the largest and smallest scores occurring in a distribution. Range is useful for determining the spread of scores among students on a test item or test. If the range of answers for a particular test item is too large, the test item may have to be investigated to determine if it is too ambiguous or if it clearly measures the learning objective. **Question:** What is the range of Test 1? **Answer**:_____

Interpret Data (cont)

Interpret Numerical Data (cont)

Descriptive Statistics (cont)	**Standard Deviation/Variance**. A standard deviation describes the amount of variability in a group of scores. Variance is defined as the average squared deviation from the mean. Variance is useful for determining how far off the mean students score on a particular test item or test. The calculations of standard deviation and variance are more complicated than those of other descriptive statistics.

Skills Check

Skills Check #5

Test scores in your class are as follows: 55, 97, 79, 82, 97, 100, 97.

1. **Determine the frequency of students who scored a 97.**

    _____

    _____

2. **Determine the mode**.

    _____

    _____

3. **Determine the median.**

    _____

    _____

4. **Determine the mean.**

    _____

    _____

5. **Determine the range**.

    _____

    _____

Interpret Data (cont)

Identify Trends

Data can be analyzed to identify trends that may reveal an instructional deficiency of some kind. A trend can be seen as a pattern of behavior or a prevailing theme. Data gathered over time (e.g., several evolutions of an instructional program) can reveal trends. The data can include information on the effectiveness of test items, the instructional program and student achievement/failure rates. Data gathered for one topic from many sources can also show trends. This type of data includes information collected from many different sources on the effectiveness of instructor performance, course materials, instructional environment, and student performance.

Failure Rates / Remedial Instructions	This type of information, recorded and analyzed over several evolutions of a course, can reveal trends concerning difficulty or ease of mastering a particular TLO or ELO. The data may indicate a need to review a particular TLO or ELO that students are having a difficult time passing, to ensure instruction is sufficient and testing procedures are appropriate. The data may also reveal the number of opportunities that need to be provided for remedial instruction, allowing the possible deletion of a designated period of remedial instruction.
Item Analysis	Item analysis provides information about the reliability and validity of test items. There are two purposes to doing an item analysis. First, it identifies defective test items. Secondly, it indicates areas that learners have not mastered. (**www.nwlink.com/~donclark/hrd.html**) ⮕ **Item Difficulty and Item Discrimination.** By comparing the proportion of learners who pass an item in contrasting groups, administrators are able to determine how many learners with high-test scores answered the question correctly or incorrectly in comparison with learners who had low-test scores. A designated percentage can be selected of the top and bottom scores. (Example: How many of the top 10 % test scorers and how many of the bottom 10 % test scorers answered the test item correctly?). This data allows the evaluator to discriminate whether the test item was only missed by the low-test scorers or if students from both the low test scorers and high test scorers missed the item. If there was a percentage from both groups, then there needs to be a more extensive evaluation of the instructional process and/or the clarity of the test item.

Interpret Data (cont)

Identify Trends (cont)

A simple analysis uses a percentage of 33 percent to divide a class into three groups – Upper (U), Middle (M), and Lower (L). For instance, if you have a class of 30 students, then the students would be divided by test scores into 10 (U) students (33 percent), 10 (M) students (33 percent), and 10 (L) students (33 percent). The graph below displays how the item discrimination would work for a test of 10 questions.

Item Analysis: Number of Learners Giving Correct Response in Each Criterion Group

Item	U (10 stu)	M (10 stu)	L (10 stu)	Difficulty (U + M + L)	Discrimination (U-L)
1	7	4	3	14	4
2	10	10	9	29	1
3	8	6	4	18	4
4	4	4	6	14	-2
5	6	7	6	19	0
6	8	7	4	19	4
7	3	0	0	3	3
8	10	7	5	22	5
9	1	2	8	11	-7
10	8	5	3	16	5

Discussion on Problem Items:_____

_____

_____

_____

_____

_____

_____

_____

Interpret Data (cont)

Identify Trends (cont)

A measure of item difficulty is obtained by adding Upper (U) + Middle (M) + Lower (L). The closer the number is to 30, the easier the question appears since there are only 30 students in the class. On item 2, 29 students answered the item correctly. Either the material is covered extremely well in the class or the question does not have convincing distractors.   On item 7, 3 students answered the question correctly. This is an indicator that the material has not been covered adequately or the test question is poorly written. The low number identifies potential problems which may be further identified through item discrimination.

A rough index (ratio) of the discriminative value (Upper test scorers compared to the Lower test scorers) of each item can be provided by subtracting the number of individuals answering an item correctly in the Lower (L) group from the number of individuals answering an item correctly in the Upper (U) group (Ex: U-L). Negative numbers indicate that there were more students from the Upper (U) group who missed the question. Positive numbers indicate that more students in the Lower (L) group missed the item. Zero indicates that there was no difference between the Upper (U) group and the Lower (L) group.

Item Analysis (cont)	**Response Analysis of Individual Items**. Further data can be gathered from the test by doing a Response Analysis of Individual Items. Additional information to that compiled from item difficulty/discrimination can be identified using response analysis. This analysis is also used to identify how well distractors function. For instance, in a multiple choice test, if 9 learners chose B, 7 chose C and nobody chose D, then the distractor D may need to be developed as a more realistic distractor. This information can be used to refine the testing instrument. Keep in mind that the response analysis from one test provides information to track for trends. There may not, at that time, be sufficient evidence from the results of one test to make a change. (www.nwlink.com/~donclark/hrd.html)

Interpret Data (cont)

MCAIMS Report

The individual response report generated by MCAIMS appears as follows:

QUES #	A	%	B	%	C	%	D	%	E	%	N/R	%
1	7	7.8652	69*	77.5281	0	0.0000	13	14.6067	0	0.0000	0	0.000
2	3	3.3708	1	1.1236	81*	91.0112	4	4.4944	0	0.0000	0	0.000

* - INDICATES CORRECT ANSWER

The number under A, B, C, D, E, and N/R indicates how many students gave that particular answer. The correct answer is indicated by the asterisk. The percentage indicates the percentage of the class that gave that answer. If over time, a class answers 100% the correct answer, then you may want to look at how the distractor can be improved. If 50% answer C and 50% answer A, then the distractor may be written to confuse or mislead. Either way, the test question needs to be reviewed.

Skills Check

Skills Check #6

Turn in your binder to the tab labeled Exercise #1 and find skills check #6. View the Individual Response Report from MCAIMS and list potential problem items. What are some possible problems with the item? Use #4 and #32 as example.

On #4, 100 percent of the class answered correctly. You may want to look at the distractors to examine if they are possible to the student who does not know the material.

On #32, 41 percent answer correctly, 16 percent answered A, 31 percent answered B, and 5 percent answered D.

Either there is a problem in how the test item is written or how the material is covered.

Interpret Data (cont)

Identify Discrepancies   At times, the different sources of data may seem to provide conflicting information. Anytime this happens, those discrepancies should be identified so that decisions will not be based upon misguided conclusions.

Record Solutions   Interpretations of data must always be documented in some form. If problems have been identified, then potential solutions should also be documented. By recording the solutions, the overall results will aid in summarizing the findings.

Summarize Data

Description After data are assimilated, they should be summarized for ease of interpreting the results. Decisions must be made regarding how the data should be summarized. Data may be summarized in paragraph form and/or a table, graph, chart, or matrix.

Identify Problem Areas The evaluator should identify any problem areas found during the interpretation of data. It is this step that identifies where changes may be necessary or what areas need to be reviewed for trends. Problem areas should be identified within the summarized data.

|	
Qualitative Data	Qualitative data are generally summarized in paragraph form. A concise paragraph should focus on what was evaluated and why, and it should describe the findings of the evaluation and, if possible, recommendations for future action.
Quantitative Data	Because summarizing quantitative data involves assigning numbers, ratings, and percentages to responses, they can best be summarized in tabular or graphic form. The point of summarizing data is to present the data to others who, though not having benefit of conducting the analysis themselves, need to understand the data to make decisions concerning the instructional program.
Statistics	Descriptive Statistics are ideal for summarizing evaluation results. Descriptive statistics can be used to present evaluation results in paragraph form. For example: ✎ 80 out of 100 students passed the written exam resulting in a pass rate of 80%. ✎ Scores on the test ranged from a low of 65 to a high of 100, with a class mean of 92.5. ✎ Students were asked to complete a comprehensive questionnaire rating the effectiveness of the instructional program. Students indicated responses on a scale of 1 to 5, 5 representing extremely effective. The mean value of class responses was 4.1, indicating an overall impression that the instructional program was very effective. ✎ (d) Of the 125 graduates surveyed, only 3 felt the instructional program did not prepare them for performance on their current job.
Graphic Summarization of Evaluation Results	Graphs, tables, and charts can be used to summarize evaluation results so that they are easily understand. Many types of data can be easily plotted on bar charts or line graphs to show relationships, indicate trends, or explain results.

Skills Check

Skills Check #7

Turn in your binder to the tab labeled Exercise #1 and find skill check #7. Write down on your Exercise sheet your analysis of what each graph indicates to them, identify problem areas, and indicate other data that needs to be considered.

Some Examples:

1. Pretest and posttest data can be plotted on a line graph to represent the effectiveness of instruction.
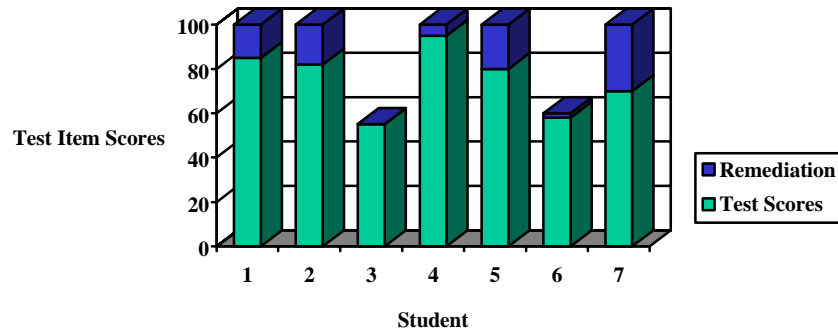
Pretest/Posttest Data

_____

_____

_____

_____

_____

_____

_____

_____
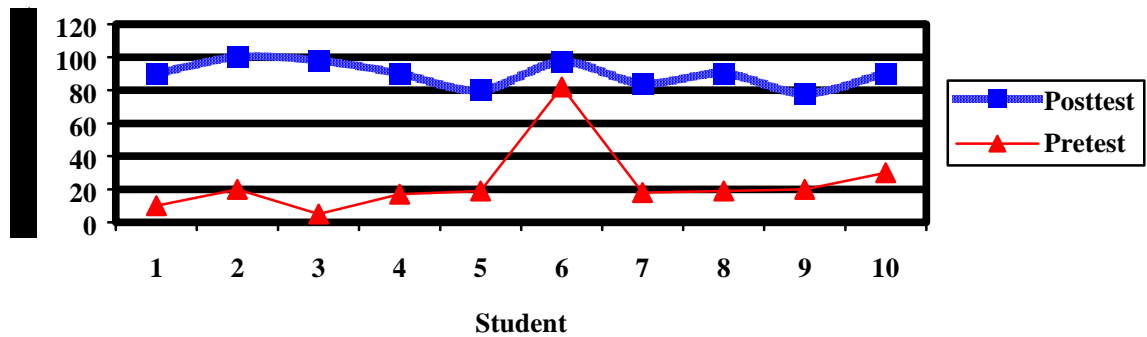
Skills Check

2. Scores from initial testing and remedial instruction can be displayed in a bar chart to clearly show the benefits of remedial instruction.
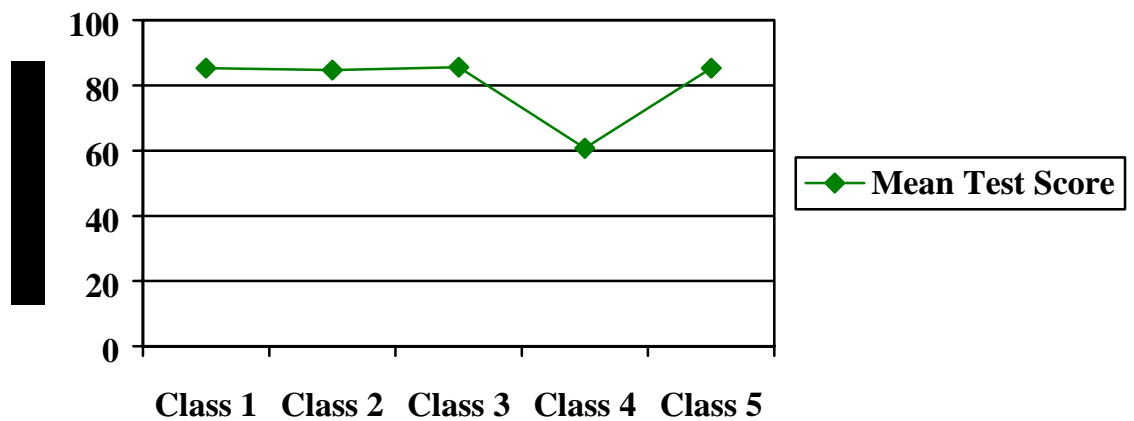
Skills Check (cont)

Some Examples (cont):

3. Means of student test scores (before remedial instruction) across several evolutions of a course can be plotted on a line graph to reveal trends.

Mean Test Scores Over Time

_____

_____

_____

_____

_____

_____

Summarize Data (cont)

Determine Facts

Determine what data is opinion and what data is factual. Both data are important, but there needs to be confirmation to problems prior to instituting changes. Though data is compiled, analyzed, and interpreted, there should be cautions adhered to when summarizing the findings/results.

Halo Effect	All items should not be rated positively due to a few positive results or comments. As referenced earlier, it is important to take adequate samples of data from each component of the instructional process.
Central Tendency	Measures of central tendency (mean, mode and median) do not provide specific information concerning each component of the instructional process therefore they should not be used as the sole indicator of effectiveness. **(DoD Mil-Handbook 1379-2)**

Determine Solutions

Decisions must be made based upon the interpretation of the data. Any recommended solution should consider future goals and the feasibility of the change within the school. **(Weiss, p. 282)** A plan of action should be formed. If revisions can be made to correct the identified problems, they should be made in a timely manner. As indicated in the Implementing the SAT course, evaluation results can mean that changes need to be made in an earlier phase of the SAT process.

Record Solutions

Evaluation results must always be documented in some form. Evaluation results are used to inform personnel about the findings resulting from the collection, analysis, and interpretation of evaluation information. Once evaluation information is interpreted, there are three courses of action that can be taken:

All evaluation data are recorded and preserved for future use should no revisions to the course be determined.
Evaluation is continued through the collection of additional data by the Functional Learning center. The focus of this evaluation is targeted at the suspected deficiency in the instructional program.
Revisions to course materials are identified and presented at a Course Content Review Board (CCRB).

References

SAT USER'S GUIDE

AF HANDBOOK 36-2235

EVALUATION 2ND EDITION

TRAINING & EDUCATION (FEB 99)

HANDBOOK OF TRAINING EVALUATION AND MEASUREMENT METHODS 3RD EDITION

WWW.NWLINK.COM/~dmclark/hrd.html

MCAIMS MANUAL

DoD MIL-HANDBOOK 1379-2

Notes